(2) A comparison of actual and predicted nominal performance.

(3) Investigation results of any launch anomaly. If flight performance deviates by more than a three-sigma dispersion from the nominal trajectory, a launch operator must conduct an investigation to determine the cause of the rocket's deviation from normal flight and take corrective action before the next launch. A launch operator must file any corrective actions with the FAA as a request for license modification before the next launch in accordance with §417.11.

§417.127 Unique safety policies, requirements and practices.

For each launch, a launch operator must review operations, system designs, analysis, and testing, and identify any unique hazards not otherwise addressed by this part. A launch operator must implement any unique safety policy, requirement, or practice needed to protect the public from the unique hazard. A launch operator must demonstrate through the licensing process that any unique safety policy, requirement, or practice ensures the safety of the public. For any change to a unique safety policy, requirement, or practice, with the exception of a launch specific update, the launch operator must file a request for license modification as required by §417.11. The FAA may identify and impose a unique safety policy, requirement, or practice as needed to protect the public.

§417.129 Safety at end of launch.

A launch operator must ensure for any proposed launch that for all launch vehicle stages or components that reach Earth orbit—

(a) There is no unplanned physical contact between the vehicle or any of its components and the payload after payload separation;

(b) Debris generation does not result from the conversion of energy sources into energy that fragments the vehicle or its components. Energy sources include chemical, pressure, and kinetic energy; and

(c) Stored energy is removed by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy.

§§417.130—417.200 [Reserved]

Subpart C—Flight Safety Analysis

§417.201 Scope and applicability.

(a) This subpart contains requirements for performing the flight safety analysis required by §417.107(f).

(b) The flight safety analysis requirements of this subpart apply to the flight of any launch vehicle that must use a flight safety system as required by §417.107(a), except as permitted by paragraph (d) of this section.

(c) The flight safety analysis requirements of §§417.203, 417.205, 417.207, 417.211, 417.223, 417.224, 417.225, 417.227, 417.229, 417.231, and 417.233 apply to the flight of any unguided suborbital launch vehicle that uses a wind-weighting safety system. Appendices B, C, and I of this part also apply.

(d) For any alternative flight safety system approved by the FAA under §417.301(b), the FAA will determine during the licensing process which of the analyses required by this subpart apply.

§417.203 Compliance.

(a) *General.* A launch operator's flight safety analysis must satisfy the performance requirements of this subpart. The flight safety analysis must also meet the requirements for methods of analysis contained in appendices A and B of this part for a launch vehicle flown with a flight safety system and appendices B and C of this part for an unguided suborbital launch vehicle that uses a wind-weighting safety system except as otherwise permitted by this section. A flight safety analysis for a launch may rely on an earlier analysis from an identical or similar launch if the analysis still applies to the later launch.

(b) *Method of analysis.* (1) For each launch, a launch operator's flight safety analysis must use—

(i) A method approved by the FAA during the licensing process;

(ii) A method approved as a license modification by the FAA; or,

(iii) If the launch takes place from a Federal launch range, a method approved as part of the FAA's launch site safety assessment of the Federal range's processes.

(2) Appendix A of this part contains requirements that apply to all methods of flight safety analysis. A licensee must notify the FAA for any change to the flight safety analysis method. A licensee must file any material change with the FAA as a request for license modification before the launch to which the proposed change would apply. Section 417.11 contains requirements governing a license modification.

(c) *Alternate analysis method.* The FAA will approve an alternate flight safety analysis method if a launch operator demonstrates, in accordance with § 406.3(b), that its proposed analysis method provides an equivalent level of fidelity to that required by this subpart. A launch operator must demonstrate that an alternate flight safety analysis method is based on accurate data and scientific principles and is statistically valid. The FAA will not find a launch operator's application for a license or license modification sufficiently complete to begin review under § 413.11 of this chapter until the FAA approves the alternate flight safety analysis method.

(d) *Analyses performed by a Federal launch range.* This provision applies to all sections of this subpart. The FAA will accept a flight safety analysis used by a Federal launch range without need for further demonstration of compliance to the FAA, if:

(1) A launch operator has contracted with a Federal launch range for the provision of flight safety analysis; and

(2) The FAA has assessed the Federal launch range, through its launch site safety assessment, and found that the range's analysis methods satisfy the requirements of this subpart. In this case, the FAA will treat the Federal launch range's analysis as that of a launch operator.

(e) *Analysis products.* For a licensed launch that does not satisfy paragraph (d) of this section, a launch operator must demonstrate to the FAA compliance with the requirements of this subpart, and must include in its demonstration the analysis products required by part 415 subpart F of this chapter, part 417 subpart A, and appendices A, B, C, and I of this part, depending on whether the launch vehicle uses a flight safety system or a wind-weighting safety system.

§ 417.205 General.

(a) *Public risk management.* A flight safety analysis must demonstrate that a launch operator will, for each launch, control the risk to the public from hazards associated with normal and malfunctioning launch vehicle flight. The analysis must employ risk assessment, hazard isolation, or a combination of risk assessment and partial isolation of the hazards, to demonstrate control of the risk to the public.

(1) *Risk assessment.* When demonstrating control of risk through risk assessment, the analysis must demonstrate that any risk to the public satisfies the public risk criteria of § 417.107(b). The analysis must account for the variability associated with:

(i) Each source of a hazard during flight;

(ii) Normal flight and each failure response mode of the launch vehicle;

(iii) Each external and launch vehicle flight environment;

(iv) Populations potentially exposed to the flight; and

(v) The performance of any flight safety system, including time delays associated with the system.

(2) *Hazard isolation.* When demonstrating control of risk through hazard isolation, the analysis must establish the geographical areas from which the public must be excluded during flight and any operational controls needed to isolate all hazards from the public.

(3) *Combination of risk assessment and partial isolation of hazards.* When demonstrating control of risk through a combination of risk assessment and partial isolation of the hazards from the public, the analysis must demonstrate that the residual public risk due to any hazard not isolated from the public under paragraph (a)(2) of this section satisfies the public risk criteria of § 417.107(b).

(b) *Dependent analyses.* Because some analyses required by this subpart are